City of Milford, CT  
Consulting Engineer: AECOM  

Gulf Pond Pump Station

Reference:
Kenneth A. Bradstreet, PE  
AECOM  
Rocky Hill, CT  
(860) 263-5800  
Kenneth.bradstreet@aecom.com

Project History

The City of Milford, CT has an extensive sewerage system that has been plagued by odor complaints for many years. High levels of hydrogen sulfide (H$_2$S) have caused severe damage to the sewer system, a key pump station and the wastewater treatment plant itself. The main cause of the problem was isolated to 13,200ft long, dual force mains, carrying an average of 3MGD from the Gulf Pond PS into the East/West Interceptor and ultimately, another mile to the West Ave. PS. Measurements of atmospheric H$_2$S in a manhole downstream of the force main discharge were as high as 900ppm.

All of the manholes on the East West Interceptor were badly deteriorated and the ductile iron sewer had developed perforations along the spring line of the pipe and had to be replaced. Effects of H$_2$S at the WWTP were not as severe as at the West Ave. PS, but still noticeable, including metal corrosion and persistent odors.

Approach

AECOM used a two pronged approach to eliminate the generation of hydrogen sulfide. The first part consisted of flow optimization to reduce the hydraulic retention time in the force main. Flow meters, motorized valves and a PLC were installed to control the usage of the two force mains.

The second part consisted of introducing a sidestream flow saturated with pure oxygen to satisfy the oxygen demand in the force main. By maintaining a positive D.O. level in the force main, sulfide formation is prevented and H$_2$S odor and corrosion eliminated.

Force Main Odor Control and Corrosion Prevention

The ECO$_2$ SuperOxygenation technology is an innovative, economical and environmentally friendly odor control solution for municipal wastewater systems including Force Mains, Headworks and Primary Clarifiers. The ECO$_2$ SuperOxygenation System dissolves oxygen into wastewater at an oxygen transfer rate of well over 90%. Dissolved oxygen readily reacts with existing sulfides and prevents anaerobic conditions and the formation of sulfides in wastewater. Eliminating hydrogen sulfide (H$_2$S) not only prevents odor, but also costly corrosion of pipes and treatment plant equipment.

We’ve helped communities from coast to coast with their odor and corrosion problems. Visit our website at www.eco2tech.com to read more about our technology and our successes.
**Project Description**

An ECO2 SuperOxygenation System was installed in 2012 at the Gulf Pond Pump Station in Milford, CT. The SuperOxygenation System is designed to dissolve 1,000 lbs/day of pure oxygen into a 1,000 gpm wastewater sidestream. The sidestream is pulled from the discharge header of the force main pumps, is run through the ECO2 Speece Cone, where it is oxygenated, and then discharged back into the force main. The ECO2 System takes advantage of the “free” pressure from the force main and raises the D.O. to the saturation level without further pressurizing the system, minimizing O&M costs.

Testing done during startup of the system indicated 95% to 98% oxygen transfer efficiency. Only dissolved oxygen is blended back into the force main, no bubbles or “micro-bubbles” are introduced into the line to avoid air locking pipes or pumps. All openings on the ECO2 System are a minimum of 4” in diameter, capable of passing dirty wastewater without clogging. The system is controlled by a PLC and an oxygen flow control panel that administer the right amount of oxygen based on real time flow data. The system operates automatically with basically no need for maintenance. The only moving part that requires standard maintenance is the sidestream pump.

---

**ECO2 SuperOxygenation System consisting of:**
4ft dia. Speece Cone, PLC & O2 Flow Controls (pump not shown)

---

**H2S Concentrations at FM Discharge ...**

**and 1 mile downstream @ West Ave PS**

---

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th><strong>Gulf Pond</strong></th>
<th><strong>Force Main</strong></th>
<th><strong>ECO2 System Design</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow—avg.</td>
<td>3 MGD</td>
<td>4 ft</td>
</tr>
<tr>
<td>Length</td>
<td>13,200 ft</td>
<td>1,000 lbs/day</td>
</tr>
<tr>
<td>Diameter</td>
<td>20” and 24”</td>
<td>1,000 gpm</td>
</tr>
<tr>
<td>HRT</td>
<td>6 hours</td>
<td>83 mg/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95% - 98%</td>
</tr>
</tbody>
</table>

---

3939 Priority Way South Drive, Suite 400 Indianapolis, IN 46240 317.706.6484 www.eco2tech.com